NAME
atanh, atanhf, atanhl − inverse hyperbolic tangent function

SYNOPSIS
#include <math.h>

double atanh(double *x***);**
float atanhf(float *x***);**
long double atanhl(long double *x***);**

Link with −*lm*.

Feature Test Macro Requirements for glibc (see feature_test_macros(7)):

atanh():
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L || _XOPEN_SOURCE >= 500 || /* Since glibc 2.19: */ _DEFAULT_SOURCE || /* Glibc versions <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE

atanhf(), **atanhl**():
_ISOC99_SOURCE || _POSIX_C_SOURCE >= 200112L || /* Since glibc 2.19: */ _DE-FAULT_SOURCE || /* Glibc versions <= 2.19: */ _BSD_SOURCE || _SVID_SOURCE

DESCRIPTION
These functions calculate the inverse hyperbolic tangent of *x*; that is the value whose hyperbolic tangent is *x*.

RETURN VALUE
On success, these functions return the inverse hyperbolic tangent of *x*.

If *x* is a NaN, a NaN is returned.

If *x* is +0 (−0), +0 (−0) is returned.

If *x* is +1 or −1, a pole error occurs, and the functions return **HUGE_VAL**, **HUGE_VALF**, or **HUGE_VALL**, respectively, with the mathematically correct sign.

If the absolute value of *x* is greater than 1, a domain error occurs, and a NaN is returned.

ERRORS
See math_error(7) for information on how to determine whether an error has occurred when calling these functions.

The following errors can occur:

Domain error: *x* less than −1 or greater than +1
errno is set to **EDOM**. An invalid floating-point exception (**FE_INVALID**) is raised.

Pole error: *x* is +1 or −1
errno is set to **ERANGE** (but see BUGS). A divide-by-zero floating-point exception (**FE_DI-VBYZERO**) is raised.

ATTRIBUTES
For an explanation of the terms used in this section, see attributes(7).

Interface	Attribute	Value
atanh(), **atanhf**(), **atanhl**()	Thread safety	MT-Safe

CONFORMING TO
C99, POSIX.1-2001, POSIX.1-2008.

The variant returning *double* also conforms to SVr4, 4.3BSD.

BUGS
In glibc 2.9 and earlier, when a pole error occurs, *errno* as set to **EDOM** instead of the POSIX-mandated **ERANGE**. Since version 2.10, glibc does the right thing.

SEE ALSO

acosh(3), asinh(3), catanh(3), cosh(3), sinh(3), tanh(3)

COLOPHON

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